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DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
Division of Solid Waste Management  
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**Contaminated Soil "Contained-in"  
Determination Guidance for Disposal**

The purpose of this document is to provide guidance to Division of Solid Waste Management (DSWM) staff regarding the applicability of the Tennessee Hazardous Waste Management Regulations (Rule Chapter 1200-1-11) and Tennessee Solid Waste Management Regulations (Rule Chapter 1200-1-7) to the disposal of soil that is contaminated with hazardous constituents listed in Appendix VIII of Rule 1200-1-11-.02. The following EPA guidance is to be utilized:

1. "Land Disposal Restrictions: Summary of the Requirements" revised August 2001 (Document EPA 530-R-01-007). (Section IV, Alternate Treatment Standards, Page 4-1). This document can be found at <http://www.epa.gov/epaoswer/hazwaste/ldr/ldr-sum.pdf>.
2. "Management of Contaminated Media", EPA, Region 4, September 7, 1999. The document can be found at <http://www.epa.gov/region4/waste/rcra/contamme.pdf>.

This EPA Guidance provides the necessary direction and explanations to determine the regulatory status of contaminated debris and soil except for the establishment of risk based levels for "contained-in" determinations regarding soil contaminated by a listed hazardous waste.

The "contained-in" principle is based on a long-standing EPA policy that applies to RCRA Subtitle C (Rule 1200-1-11) requirements for environmental media contaminated with hazardous waste and is not altered by this document. Under the contained-in policy, environmental media (e.g., soil) must be managed as a hazardous waste as long as it contains listed hazardous waste or exhibits a hazardous waste characteristic. Also under the contained-in policy, when hazardous waste constituents are present in media below **site-specific risk-based levels**, the media is no longer required to be managed as a hazardous waste. The decision to no longer regulate media as a hazardous waste is made by the DSWM on a case-by-case basis via a "contained-in" determination. This document provides additional guidance for DSWM staff to use in establishing risk-based levels for making "contained-in" determinations that is not found in the EPA Guidance.

The prerequisite criteria that **must** be met prior to proceeding with the "contained-in" determinations for all soil contaminated by a listed hazardous waste(s) is that the contaminated soil shall not contain concentration(s) of any constituent(s) such that the soil exhibits the characteristic(s) of a hazardous waste under 1200-1-11-.02(3).

After the prerequisite criteria above have been met, the DSWM may proceed in determining the site-specific risk-based levels for the contaminated soil. If the concentration of the hazardous waste constituents present in the media are below site-specific risk-based levels, the listed hazardous waste is not "contained-in" the media and the media will no longer be managed as a hazardous waste. The disposal method for the contaminated soil is the determining factor in the establishment of the site-specific risk-based levels. (Notes: Contaminated soil that exhibits a hazardous waste characteristic in 1200-1-11-.02(3) and is treated so that it no longer exhibits the characteristic(s) is subject to LDR treatment standards under 1200-1-11-.10(3) for ALL underlying hazardous constituents. The definition of underlying hazardous constituent is the same for characteristic and listed hazardous waste. Rule 1200-1-11-.10(1)(b)10 states that: "Underlying hazardous constituent" means any constituent listed in subparagraph (3)(i) of this Rule, Table UTS-Universal Treatment Standards, except fluoride, selenium, sulfides, vanadium and zinc, which can reasonably be expected to be present at the point of generation of the hazardous waste, at a concentration above the constituent-specific UTS treatment standard. All sampling and analyses for compliance with this policy shall be in accordance with EPA publication SW-846.)

There are five disposal scenarios that determine the site-specific risk-based levels. The prerequisite criteria for contaminated soil **must** be met prior to applying the risk-based disposal scenarios.

1. If the soil contaminated by a listed hazardous waste(s) is disposed on-site of a RCRA permitted hazardous waste facility as part of corrective action for solid waste management units at a permitted facility, then the risk-based levels must be established in compliance with Rule 1200-1-11-.06(6)(l). (Refer to the **Note** on page 3.)
2. If the soil contaminated by a listed hazardous waste(s) is disposed on-site of a remediation site as part of a remedial action plan (RAP) as authorized under Rule 1200-1-11-.07(11) then the risk-based levels must be established in compliance with Rule 1200-1-11-.07(11). (Refer to the **Note** on page 3.)
3. If the soil contaminated by a listed hazardous waste(s) is disposed of in a RCRA permitted hazardous waste subtitle C landfill, then the contaminated soil can not contain concentration(s) of any constituent(s) for the listing and underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)].
4. If the soil contaminated by a listed hazardous waste(s) is disposed of in a permitted solid waste subtitle D landfill (class 1 or 2) and if special waste approval is granted, then the contaminated soil can not contain concentration(s) of any constituent(s) for the listing and underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)]. This is consistent with the management of contaminated soil that was a characteristic hazardous waste but after treatment does not exhibit any of the characteristic(s) of a hazardous waste under 1200-1-11-.02(3) and does not contain concentration(s) of any of the underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)].

5. If the soil contaminated by a listed hazardous waste(s) is disposed of under any scenario other than those listed in items 1 through 4 above, then the request would not only be a "contained-in" determination but also would have to document that the soil is not a solid waste. The generator would have to request and prove that the soil was clean, requiring no management restrictions. The risk-based levels must be established to ensure that levels of all hazardous constituents and the combination of the hazardous constituents remaining in the soil pose no threat to human health and the environment under any circumstances. At a minimum the determination of risk-based levels must address, but is not limited to, the following:
- (i) Concentrations of each hazardous constituent in the soil and likely to migrate from the soil for all human exposure routes (inhalation, dermal, ingestion) and an evaluation of the combined effect of multiple constituencies ;
  - (ii) Concentrations of each hazardous constituent in the soil and likely to migrate from the soil for all environmental exposure routes and receptors (fish, animal, birds, crops, etc.) and an evaluation of the combined effect of multiple constituencies;
  - (iii) The risk-based level is derived in a manner consistent with Environmental Protection Agency guidelines for assessing the health risks of environmental pollutants (51 CFR 33992, 34006, 34014, 34028, Sept. 24, 1986);
  - (iv) The risk-based level is based on scientifically valid studies conducted in accordance with the Toxic Substances Control Act Good Laboratory Practice Standards (40 CFR part 792, August 17, 1989) or equivalent;
  - (v) For carcinogens, the risk-based level represents a concentration associated with an excess lifetime cancer risk level (due to continuous lifetime exposure) of less than  $1.0 \times 10^{-6}$ ; and
  - (vi) For systemic toxicants, the risk-based level represents a concentration to which the human population (including sensitive subgroups) could be exposed to on a daily basis that is likely to be without appreciable risk of deleterious effects during a lifetime. For purposes of this subpart, systemic toxicants include toxic chemicals that cause effects other than cancer or mutation.

**Note:** EPA Region 4 and the DSWM currently use EPA Region 9 Preliminary Remediation Goals (PRGs) as a guide for the risk based levels in determining the contained-in status. EPA Region 9 PRGs can be useful in determining the appropriate site-specific risk-based levels. However, please review the User's Guide and Background Technical Document for EPA Region 9 PRGs when establishing site-specific risk-based levels. As one example, Section 3.3 (Screening with Multiple Pollutants) of the user's guide addresses an approach for multiple constituents. The information regarding EPA Region 9 PRGs can be found at <http://www.epa.gov/region09/waste/sfund/prg/index.html>. The EPA Region 9 PRGs with the User's Guide and Background Technical Document are also useful in determining the appropriate site-specific risk-based clean up levels.

The request for a 'contained-in' determination shall be in a document that contains:

1. A list of **all** the hazardous constituents in the soil;

2. A description of how the hazardous constituents got into the soil (spill, leak, disposal, etc.);
3. The hazardous waste determination (listing and characteristic) required under Rule 1200-1-11-.03(1)(b);
4. All sampling and analytical information/data including sampling methods and locations, laboratory report sheets and chain of custody forms; and
5. The proposed risk based numbers for each hazardous constituent and the source (LDR standards, Region 9 PRGs, etc.).

The generator shall certify the 'contained-in' determination request document as follows:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information."

#### NOTICE

The guidance provided in this document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the State of Tennessee. DSWM officials may follow the guidance provided in this document, or vary from the guidance, based on site-specific circumstances. The DSWM also reserves the right to change this guidance at any time without public notice.



Mike Apple, Director  
Division of Solid Waste Management

Effective Date October 30, 2006

**Examples of Implementation  
of the Contaminated Soil "Contained-in"  
Determination Guidance for Disposal  
(Revised April 4, 2007)**

This document provides three examples for implementation of the *Contaminated Soil "Contained-in" Determination Guidance for Disposal*, effective October 30, 2006. This guidance is only applicable to contaminated soil and is not applicable to other hazardous waste. All requests for a "contained-in" determination shall be submitted for review and approval of the Division of Solid Waste Management. All "Contained-in" Determination Requests shall be certified and contain the information/data as required on pages 3 and 4 of the *Contaminated Soil "Contained-in" Determination Guidance for Disposal*, effective October 30, 2006. [Note: Land disposal restrictions apply to all wastes that are characteristic and/or listed hazardous wastes under 1200-1-11-.02(3) and always continue to apply. If a characteristic hazardous waste is treated and no longer exhibits the characteristic of a hazardous waste the land disposal restrictions continue to apply. Additionally please be advised that tracking and recordkeeping requirements for land disposal restrictions are applicable under Rule 1200-1-11-.10(1)(g).]

**Example One - Non-Listed Hazardous Waste-**

**Given:**

1. Company ABC is cleaning up a battery-cracking site that operated from 1950 until 1965.
2. Contaminated soil to be excavated at the site is a characteristic hazardous waste (Code D008) because when subject to Toxicity Characteristic Leaching Procedure (TCLP) the extract contained concentrations of lead above the regulatory limit of 5.0 mg/l. The contaminated soil exhibits the characteristic of a hazardous waste.
3. There are no underlying hazardous constituents as defined in 1200-1-11-.10(1)(b)10.
4. Company ABC wants to treat the contaminated soil and has requested to dispose of it in a permitted class I solid waste landfill (subtitle D non-hazardous waste landfill with liner and leachate collection system).

**Question to the Division of Solid Waste Management-** What is the applicable and acceptable risk based level of lead in the treated contaminated soil in order for it to be disposed of in the class I landfill?

**Background-** Since this contaminated soil does not contain a listed waste, a "contained-in" determination is not applicable. But the land disposal restriction (LDR) for D008 waste of 0.75 mg/l in the extract from the TCLP test is applicable. (Obtained from the table titled "Treatment Standards for Hazardous Waste" found in Rule 1200-1-11-10.) However, the facility may use the alternative LDR treatment standard for contaminated soil under Rule 1200-1-11-.10(3)(j) of 10 times 0.75 mg/l (TCLP) resulting in an alternative LDR of 7.5 mg/l (TCLP). Although the regulations do allow alternate

**Examples of Implementation  
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treatment standard based on a 90 percent reduction, as a standard policy the DSWM will authorize 10 times the original standard as the alternate LDR standard. However there is a more restrictive standard than the alternative LDR standard for lead under Rule 1200-1-11-.02(3)(e) which is toxicity characteristic standard of 5.0 mg/l (TCLP).

**Answer-**

**If the contaminated soil is approved for disposal as a special waste in a class 1 or class 2 landfill, the standard that must be complied with is the toxicity characteristic standard of 5.0 mg/l (TCLP) for lead. The contaminated soil must be treated so that the extract from the TCLP test is less than 5.0 mg/l.** [Note: If the total concentrations of lead are below 100 mg/kg, then the waste would not exceed the toxicity characteristic standard of 5.0 mg/l (TCLP) because of the 20 times dilution factor for TCLP test. 99 mg/kg (Total) divided by 20 (the dilution factor for TCLP) is 4.95 mg/l that is less than 5.0 mg/l (TCLP).]

**Example Two - Listed Hazardous Waste**

**Givens:**

1. Superfund is cleaning up a manufacturing facility that operated from 1950 until 1965.
2. Contaminated soil to be excavated at the site is contaminated with tetrachloroethylene. The historical information indicated that the tetrachloroethylene was used as a dry cleaner solvent so the spent tetrachloroethylene when excavated would meet the definition as a listed hazardous waste (Code F002). Please be advised the contaminated soil could also be a characteristic hazardous waste (Code D039) if when subject to Toxicity Characteristic Leaching Procedure (TCLP), the extract contained concentrations of tetrachloroethylene above the regulatory limit of 0.7 mg/l.
3. There are no underlying hazardous constituents as defined in 1200-1-11-.10(1)(b)10.
4. Superfund has requested to dispose of it in a permitted class I solid waste landfill (subtitle D non-hazardous waste landfill with liner and leachate collection system).

**Question to the Division of Solid Waste Management-** What is the applicable and acceptable risk based levels of tetrachloroethylene in the contaminated soil in order for it to be disposed of in the class I landfill?

**Examples of Implementation  
of the Contaminated Soil "Contained-in"  
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**Background-** In accordance with the DSWM's Contaminated Soil "Contained-in" Determination Guidance for Disposal policy there are five disposal scenarios that determine the site-specific risk-based levels for "contained-in" determinations. In this case disposal scenario number 4 of the policy applies and states:

If the soil contaminated by a listed hazardous waste(s) is disposed of in a permitted solid waste subtitle D landfill (class 1 or 2) and if special waste approval is granted, then the contaminated soil can not contain concentration(s) of any constituent(s) for the listing and underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)]. This is consistent with the management of contaminated soil that was a characteristic hazardous waste but after treatment does not exhibit any of the characteristic(s) of a hazardous waste under 1200-1-11-.02(3) and does not contain concentration(s) of any of the underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)].

The applicable land disposal restriction (LDR) for F002 and D039 due to the tetrachloroethylene is a total concentration of 6.0 mg/kg (Total). (Standard obtained from the table titled "Treatment Standards for Hazardous Waste" found in Rule 1200-1-11-10.) However, the facility may use the alternative LDR treatment standard under Rule 1200-1-11-.10(3)(j) of 10 times 6.0 mg/kg (Total), resulting in an alternative LDR standard of 60 mg/kg (Total). Although the regulations do allow an alternate treatment standard based on a 90 percent reduction, as a standard policy the DSWM will authorize 10 times the original standard as the alternate LDR standard. The alternative LDR standard of 60 mg/kg (Total) divided by 20 (the dilution factor for TCLP) is 3 mg/l that is greater than 0.7 mg/l (TCLP). However there could be a more restrictive standard than the alternative LDR standard total concentration under Rule 1200-1-11-.02(3)(e) which is toxicity characteristic standard of 0.7 mg/l (TCLP).

**Answer-**

If the contaminated soil is approved for disposal as a special waste in a class 1 or class 2 landfill, two risk based levels must be complied with for tetrachloroethylene that are the alternate LDR standard of 60 mg/kg (Total) and the toxicity characteristic standard of 0.7 mg/l (TCLP). The contaminated soil must be treated so that the total concentration of tetrachloroethylene is equal to or below 60 mg/kg and the extract from the TCLP test is less than 0.7 mg/l in order for the contaminated soil to no longer "contain" a hazardous waste. [Note: If the total concentrations of tetrachloroethylene are below 14 mg/kg, then the waste would not exceed the toxicity characteristic standard of 0.7 mg/l (TCLP) because of the 20 times dilution factor for TCLP test. 13 mg/kg (Total) divided by 20 (the dilution factor for TCLP) is 0.65 mg/l that is less than 0.7 mg/l (TCLP).]

**Examples of Implementation  
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**Example Three - Listed Hazardous Waste**

**Givens:**

1. Company XYZ is cleaning up a manufacturing facility that operated from 1950 until 1965.
2. Contaminated soil to be excavated at the site is contaminated with toluene. The historical information indicated that the toluene was used as a cleaning solvent so the spent toluene when excavated would meet the definition of a listed hazardous waste (Code F005).
3. Xylenes are underlying hazardous constituents as defined in 1200-1-11-.10(1)(b)10
4. Company XYZ has requested to dispose of it in a permitted class I solid waste landfill (subtitle D non-hazardous waste landfill with liner and leachate collection system).

**Question to the Division of Solid Waste Management-** What is the applicable and acceptable risk based levels of toluene and xylene in the contaminated soil in order for it to be disposed of in the class I landfill?

**Background-** In accordance with the DSWM's Contaminated Soil "Contained-in" Determination Guidance for Disposal policy there are five disposal scenarios that determine the site-specific risk-based levels for "contained-in" determinations. In this case disposal scenario number 4 of the policy applies and states:

If the soil contaminated by a listed hazardous waste(s) is disposed of in a permitted solid waste subtitle D landfill (class 1 or 2) and if special waste approval is granted, then the contaminated soil can not contain concentration(s) of any constituent(s) for the listing and underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)]. This is consistent with the management of contaminated soil that was a characteristic hazardous waste but after treatment does not exhibit any of the characteristic(s) of a hazardous waste under 1200-1-11-.02(3) and does not contain concentration(s) of any of the underlying hazardous constituents above either the LDR as-generated treatment standards or the soil alternate treatment standards [both standards are found in Rule 1200-1-11-.10(3)].

Risk-based levels must be established for toluene and the underlying constituents of xylenes.



**Examples of Implementation  
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(Revised April 4, 2007)  
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**For Toluene-** The applicable land disposal restriction (LDR) for F005 due to the toluene is a total concentration of 10 mg/kg (Total). (Standard obtained from the table titled "Treatment Standards for Hazardous Waste" found in Rule 1200-1-11-10.) However, the facility may use the alternative LDR treatment standard under Rule 1200-1-11-10(3)(j) of 10 times 10 mg/kg (Total), resulting in an alternative LDR standard of 100 mg/kg (Total). Although the regulations do allow alternate treatment standard based on a 90 percent reduction, as a standard policy the DSWM will authorize 10 times the original standard as the alternate LDR standard.

The risk based level that applies for toluene is 100 mg/kg (Total).

**For Xylenes-** The applicable land disposal restriction (LDR) for the underlining hazardous constituent xylenes is a total concentration of 30 mg/kg (Total). (Obtained from the table titled "Universal Treatment Standards" found in Rule 1200-1-11-10.). However, the facility may use the alternative LDR treatment standard under Rule 1200-1-11-10(3)(j) of 10 times 30 mg/kg (Total), resulting in an alternative LDR standard of 300 mg/kg (Total). Although the regulations do allow alternate treatment standard based on a 90 percent reduction, as a standard policy the DSWM will authorize 10 times the original standard as the alternate LDR standard.

The risk based level that applies for xylenes is 300 mg/kg (Total).

**Answer-**

**If the contaminated soil is approved for disposal as a special waste in a class 1 or class 2 landfill, the risk based levels that must be complied with for this contaminated soil is alternate LDR standards of 100 mg/kg (Total) for toluene and 300 mg/kg (Total) xylenes. The contaminated soil must be treated so that the total concentration of toluene is equal to or below 100 mg/kg and the total concentration of xylenes is equal to or below 300 mg/kg in order for the contaminated soil to no longer "contain" a hazardous waste.**